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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/692,258	10/23/2003	Dae-Kwon Jung	678-1295 (P11335)	1574

28249 7590 04/03/2007
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EXAMINER

MERED, HABTE

ART UNIT	PAPER NUMBER
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2616

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/03/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.		Applicant(s)	
	10/692,258		JUNG ET AL.	
	Examiner		Art Unit	
	Habte Mered		2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10/23/2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is in response to the communication filed on 10/23/2003.
2. Claims 1-6 are pending in the instant Application. Claims 1 and 4 are the independent claims.

Claim Objections

1. Claim 1 is objected to because of the following informalities:

In line 9 of claim 1 the phrase "IFFT (Inverse Fast Fourier Transform)-transforming" needs to be replaced with the phrase "IFFT (Inverse Fast Fourier Transform)-transforming", there by removing the unnecessary hyphen. Also in the claim the variable n is initially defined as the preamble sequence length but in the claim it also says "n subcarriers" in line 8 of claim 1 which at times can be confusing when determining what n represents. Even though claim 1 is clear to the Examiner in view of the specification it will make the claim much more clearer if a different variable is used to represent the portion of the m subcarriers that are mapped to the preamble sequence of length n.

Appropriate correction is required.

2. Claim 4 is objected to because of the following informalities:

In line 10 of claim 4 the phrase "IFFT-transforming" needs to be replaced with the phrase "IFFT transforming", there by removing the unnecessary hyphen. Also in the claim the variable n is initially defined as the preamble sequence length but in the claim it also says "n subcarriers" in line 8 of claim 4 which at times can be confusing when determining what n represents. Even though claim 4 is clear to the Examiner in view of

the specification it will make the claim much more clearer if a different variable is used to represent the portion of the m subcarriers that are mapped to the preamble sequence of length n .

Appropriate correction is required.

3. Claims 3 and 6 are objected to because of the following informalities: The variable P is undefined in these claims. The function $\text{sqrt}(2)$ is also undefined in these claims. Further what the rows and columns represent is not specified at all. Last but not least the variable n represents subcarriers and can be confusing given that n also represents the length of the preamble sequence.

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. **Claims 1-3** are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claims 1-3 indicate a method of generating preamble sequence in OFDM communication. However, claims 1-3 fail to disclose a practical application that provides a useful, concrete, and tangible result including what physical action or change will occur or follow as a result of generating the preamble sequence.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **Claims 1-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Bohenke et al (US 6, 654, 339 B1), hereinafter referred to as Bohenke, in view of Mody et al (US 2003/0072452 A1), hereinafter referred to as Mody.

Bohenke teaches generating preamble sequence in OFDM communication for the purpose of synchronization.

3. Regarding **claims 1 and 4**, Bohenke discloses a method and apparatus (**See Figures 1 and 2**) for generating a preamble sequence in an orthogonal frequency division multiplexing (OFDM) communication system having m subcarriers in a frequency domain (**The tables in column 4 and 6 show the subcarriers ranging from C00 to C11 and m being 12**), the method comprising the steps of: generating a preamble sequence of length n that is mapped to n subcarriers on a one-to-one basis (**See Column 2:60-67 and Column 3:1-5. Also see the transmitter in Figure where the sequence is generated in Figure 1, element 2.**); and assigning components constituting the preamble sequence to the n subcarriers among the m subcarriers on a one-to-one mapping basis (**In Figure 1, element 2 is responsible for generating the preamble sequence and mapping it to the subcarriers as seen in Figure 3. In Figure 3, there are 12 subcarriers and the Preamble length, $n=16$ (i.e. 0 to 15)), assigning null data to remaining subcarriers excluding the n subcarriers from the m subcarriers (**In Figure 3, null data is assigned to preamble sequence numbers 0 and 7-9. Since $n-m$ are required to be null in this case $n-m=16-12=4$****

nulls which is correct given sequences 0, 7, 8, and 9 add up to 4), and then IFFT (Inverse Fast Fourier Transform)-transforming the assigned result into time-domain data (The IFFT in Figure 1 element 3 and its output in Figure 1, element 4 is time domain data).

Bohenke fails to disclose that the length of the preamble sequence, n , is greater than m , the number of subcarriers.

Mody also teaches generating preamble sequence in OFDM communication.

Mody discloses that the length of the preamble sequence, n , is greater than m , the number of subcarriers. **(See Paragraph 68 and Figures 7 and 8)**

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Bohenne's method and apparatus to incorporate step of having the length of the preamble sequence, n , greater than m , the number of subcarriers. The motivation being to create an efficient preamble structure to accomplish time synchronization, frequency offset estimation, channel estimation and noise variance estimation as stated by Mody in Paragraph 68.

4. Regarding **claims 2 and 5**, Bohenne discloses a method and apparatus, wherein the preamble sequence generating step comprises the step of generating the preamble sequence so that the null data is inserted in a particular subcarrier corresponding to a direct current (DC) component in the frequency domain among the n subcarriers.

(Based on the Applicant's teachings in the specification on page 17 and Figure 5 of the Applicant's drawings – DC component is the value of the subcarrier assigned to the 0th entry of the IFFT unit. In Bohenne's Figure 3 the 0th entry of the IFFT

being the DC component has a null value as required in these claims. See also Column 4:52-57)

5. Regarding **claims 3 and 6**, Bohenske discloses a method and apparatus, wherein if $m=256$ and $n=200$ then the preamble sequence is generated as follows $P(-100,$

$100)=\{$

1 0-10-10-1010110 [-100:-89]

1010-1010-10-10-1 [-88: -76]

.....

....

0-10-1010-10-10-1 [89: 100]

$\}*\sqrt{2}*\sqrt{2})(+1)$

where “-n:n” represents subcarriers of -nth to nth subcarriers. (**Bohenke has already shown the generation preamble sequence for $m=16$ and $n=12$ and the actual sequences are shown in Column 6:35-45 and with $m=256$ and $n=200$ will result in the same sequence as shown in this limitation.**)

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Habte Mered whose telephone number is 571 272 6046. The examiner can normally be reached on Monday to Friday 9:30AM to 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Doris H. To can be reached on 571 272 7629. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2616

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HM

3-29-2007



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